

Release notes for ENDF/B Development n-098\_Cf\_246  
evaluation

**ENDF**  
B-VII.dev

April 26, 2017

- fudge-4.0 Warnings:

1. Cross section does not match sum of linked reaction cross sections  
*crossSectionSum label 0: total (Error # 0): CS Sum.*

WARNING: Cross section does not match sum of linked reaction cross sections! Max diff: 0.41%

2. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 1 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'1 delayed'] + gamma [total fission] [nubar]): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

3. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 2 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'1 delayed'] + gamma [total fission] [nubar]): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (1.517173e-09) is too small

4. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 3 (total): / Form 'eval': / Component 0 (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

5. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 3 (total): / Form 'eval': / Component 1 (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

6. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 4 (n + Cf246): / Form 'eval': / Component 0 (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

7. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 4 (n + Cf246): / Form 'eval': / Component 1 (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

8. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 8 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'1 delayed'] + gamma [total fission]): / Form 'eval': / Component 0 (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

9. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 8 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'1 delayed'] + gamma [total fission]): / Form 'eval': / Component 1 (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

10. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 9 (n + (Cf246\_e1 ->Cf246 + gamma)): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (7.433865e-10) is too small

11. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 10 (n + (Cf246\_e2 ->Cf246 + gamma)): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (4.088487e-09) is too small

12. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 11 (n + (Cf246\_e3 ->Cf246 + gamma)): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (5.839690e-09) is too small

13. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 12 (n + (Cf246\_e4 ->Cf246 + gamma)): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (7.817113e-11) is too small

14. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 13 (n + (Cf246\_c ->Cf246 + gamma)): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

15. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 14 (Cf247 + gamma): / Form 'eval': / Component 0 (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

16. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 14 (Cf247 + gamma): / Form 'eval': / Component 1 (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

17. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 15 (n + Cf246 [angular distribution]): / Form 'eval': (Error # 1): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

18. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 16 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'1 delayed'] + gamma [total fission] [spectrum]): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

19. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 17 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'1 delayed'] + gamma [total fission] [spectrum]): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

20. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 18 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'1 delayed'] + gamma [total fission] [spectrum]): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

21. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.  
*Section 19 (n[multiplicity:'energyDependent', emissionMode:'prompt'] + n[emissionMode:'1 delayed'] + gamma [total fission] [spectrum]): / Form 'eval': (Error # 0): Condition num.*

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

• fudge-4.0 Errors:

1. Energy range of data set does not match cross section range  
*reaction label 5: n + (Cf246\_c -> Cf246 + gamma) / Product: Cf246\_c / Decay product: gamma\_a / Multiplicity: (Error # 0): Domain mismatch (a)*

WARNING: Domain doesn't match the cross section domain: (147603.0 -> 20000000.0) vs (110904.0 -> 20000000.0)

2. Energy range of data set does not match cross section range  
*reaction label 5: n + (Cf246\_c -> Cf246 + gamma) / Product: Cf246\_c / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)*

WARNING: Domain doesn't match the cross section domain: (147603.0 -> 20000000.0) vs (110904.0 -> 20000000.0)

WARNING: Domain doesn't match the cross section domain: (250000.0 -> 20000000.0) vs (110904.0 -> 20000000.0)

WARNING: Domain doesn't match the cross section domain: (500000.0 -> 20000000.0) vs (110904.0 -> 20000000.0)

WARNING: Domain doesn't match the cross section domain: (700000.0 -> 20000000.0) vs (110904.0 -> 20000000.0)

3. Energy range of data set does not match cross section range  
*reaction label 5:  $n + (Cf246\_c \rightarrow Cf246 + \text{gamma}) / \text{Product: Cf246\_c} / \text{Decay product: gamma\_b} / \text{Multiplicity: (Error \# 0): Domain mismatch (a)}$*   
 WARNING: Domain doesn't match the cross section domain: (250000.0 -> 20000000.0) vs (110904.0 -> 20000000.0)
4. Energy range of data set does not match cross section range  
*reaction label 5:  $n + (Cf246\_c \rightarrow Cf246 + \text{gamma}) / \text{Product: Cf246\_c} / \text{Decay product: gamma\_c} / \text{Multiplicity: (Error \# 0): Domain mismatch (a)}$*   
 WARNING: Domain doesn't match the cross section domain: (500000.0 -> 20000000.0) vs (110904.0 -> 20000000.0)
5. Energy range of data set does not match cross section range  
*reaction label 5:  $n + (Cf246\_c \rightarrow Cf246 + \text{gamma}) / \text{Product: Cf246\_c} / \text{Decay product: gamma\_d} / \text{Multiplicity: (Error \# 0): Domain mismatch (a)}$*   
 WARNING: Domain doesn't match the cross section domain: (700000.0 -> 20000000.0) vs (110904.0 -> 20000000.0)
6. Calculated and tabulated Q values disagree.  
*reaction label 6:  $n[\text{multiplicity:}'2'] + Cf245 + \text{gamma} (\text{Error \# 0}): Q \text{ mismatch}$*   
 WARNING: Calculated and tabulated Q-values disagree: -7325276.999145508 eV vs -7366460. eV!
7. Energy range of data set does not match cross section range  
*reaction label 6:  $n[\text{multiplicity:}'2'] + Cf245 + \text{gamma} / \text{Product: gamma\_a} / \text{Multiplicity: (Error \# 0): Domain mismatch (a)}$*   
 WARNING: Domain doesn't match the cross section domain: (8000000.0 -> 20000000.0) vs (7396650.0 -> 20000000.0)
8. Energy range of data set does not match cross section range  
*reaction label 6:  $n[\text{multiplicity:}'2'] + Cf245 + \text{gamma} / \text{Product: gamma\_a} / \text{Distribution: / uncorrelated - angular - isotropic: (Error \# 0): Domain mismatch (a)}$*   
 WARNING: Domain doesn't match the cross section domain: (8000000.0 -> 20000000.0) vs (7396650.0 -> 20000000.0)
9. Calculated and tabulated Q values disagree.  
*reaction label 7:  $n[\text{multiplicity:}'3'] + Cf244 + \text{gamma} (\text{Error \# 0}): Q \text{ mismatch}$*   
 WARNING: Calculated and tabulated Q-values disagree: -13488966.34539795 eV vs -1.35302e7 eV!
10. Energy range of data set does not match cross section range  
*reaction label 7:  $n[\text{multiplicity:}'3'] + Cf244 + \text{gamma} / \text{Product: gamma\_a} / \text{Multiplicity: (Error \# 0): Domain mismatch (a)}$*   
 WARNING: Domain doesn't match the cross section domain: (14000000.0 -> 20000000.0) vs (13585600.0 -> 20000000.0)
11. Energy range of data set does not match cross section range  
*reaction label 7:  $n[\text{multiplicity:}'3'] + Cf244 + \text{gamma} / \text{Product: gamma\_a} / \text{Distribution: / uncorrelated - angular - isotropic: (Error \# 0): Domain mismatch (a)}$*   
 WARNING: Domain doesn't match the cross section domain: (14000000.0 -> 20000000.0) vs (13585600.0 -> 20000000.0)
12. Energy range of data set does not match cross section range  
*reaction label 7:  $n[\text{multiplicity:}'3'] + Cf244 + \text{gamma} / \text{Product: gamma\_b} / \text{Multiplicity: (Error \# 0): Domain mismatch (a)}$*

- WARNING: Domain doesn't match the cross section domain: (14500000.0 -> 20000000.0) vs (13585600.0 -> 20000000.0)
13. Energy range of data set does not match cross section range  
*reaction label 7: n[multiplicity:'3'] + Cf244 + gamma / Product: gamma\_b / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)*

WARNING: Domain doesn't match the cross section domain: (14500000.0 -> 20000000.0) vs (13585600.0 -> 20000000.0)

  14. Energy range of data set does not match cross section range  
*reaction label 7: n[multiplicity:'3'] + Cf244 + gamma / Product: gamma\_c / Multiplicity: (Error # 0): Domain mismatch (a)*

WARNING: Domain doesn't match the cross section domain: (14500000.0 -> 20000000.0) vs (13585600.0 -> 20000000.0)

  15. Energy range of data set does not match cross section range  
*reaction label 7: n[multiplicity:'3'] + Cf244 + gamma / Product: gamma\_c / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)*

WARNING: Domain doesn't match the cross section domain: (14500000.0 -> 20000000.0) vs (13585600.0 -> 20000000.0)

  16. Energy range of data set does not match cross section range  
*reaction label 7: n[multiplicity:'3'] + Cf244 + gamma / Product: gamma\_d / Multiplicity: (Error # 0): Domain mismatch (a)*

WARNING: Domain doesn't match the cross section domain: (14500000.0 -> 20000000.0) vs (13585600.0 -> 20000000.0)

  17. Energy range of data set does not match cross section range  
*reaction label 7: n[multiplicity:'3'] + Cf244 + gamma / Product: gamma\_d / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)*

WARNING: Domain doesn't match the cross section domain: (14500000.0 -> 20000000.0) vs (13585600.0 -> 20000000.0)

  18. Calculated and tabulated Q values disagree.  
*reaction label 9: Cf247 + gamma (Error # 0): Q mismatch*

WARNING: Calculated and tabulated Q-values disagree: 6067608.857421875 eV vs 6026430. eV!

  19. Multiplicity does not match sum of linked product multiplicities!  
*multiplicitySum label 7: n + (Cf246\_c -> Cf246 + gamma) total gamma multiplicity (Error # 0): summedMultiplicityMismatch*

WARNING: Multiplicity does not match sum of linked product multiplicities! Max diff: 33.47%

  20. Multiplicity does not match sum of linked product multiplicities!  
*multiplicitySum label 8: n[multiplicity:'2'] + Cf245 + gamma total gamma multiplicity (Error # 0): summedMultiplicityMismatch*

WARNING: Multiplicity does not match sum of linked product multiplicities! Max diff: 44.32%

  21. Multiplicity does not match sum of linked product multiplicities!  
*multiplicitySum label 9: n[multiplicity:'3'] + Cf244 + gamma total gamma multiplicity (Error # 0): summedMultiplicityMismatch*

WARNING: Multiplicity does not match sum of linked product multiplicities! Max diff: 54.70%

22. Calculated and tabulated Q values disagree.  
*fissionComponent label 0: /reactionSuite/fissionComponents/fissionComponent[@label='0']*  
 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 230151233840.8549 eV vs 2.190356e8 eV!
23. Calculated and tabulated Q values disagree.  
*fissionComponent label 1: /reactionSuite/fissionComponents/fissionComponent[@label='1']*  
 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 230151233840.8549 eV vs 2.190356e8 eV!
24. Calculated and tabulated Q values disagree.  
*fissionComponent label 2: /reactionSuite/fissionComponents/fissionComponent[@label='2']*  
 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 230151233840.8549 eV vs 2.190356e8 eV!
25. Calculated and tabulated Q values disagree.  
*fissionComponent label 3: /reactionSuite/fissionComponents/fissionComponent[@label='3']*  
 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 230151233840.8549 eV vs 2.190356e8 eV!
26. A covariance matrix was not positive semi-definite, so it has negative eigenvalues.  
*Section 15 (n + Cf246 [angular distribution]): / Form 'eval': / LegendreLValue L=1 vs 1*  
 (Error # 0): Bad evs
- WARNING: 9 negative eigenvalues! Worst case = -1.729326e-05

• njoy2012 Warnings:

1. Evaluation has no resonance parameters given  
*unresr...calculation of unresolved resonance cross sections (0): No RR*

---message from unresr---mat 9843 has no resonance parameters  
 copy as is to nout

2. In some evaluations, the partial fission reactions MT=19, 20, 21, and 38 are given in File 3, but no corresponding distributions are given. In these cases, it is assumed that MT=18 should be used for the fission neutron distributions.  
*heatr...prompt kerma (0): HEATR/hinit (3)*

---message from hinit---mt19 has no spectrum  
 mt18 spectrum will be used.

3. Recoil is not given, so one-particle recoil approximation used.  
*heatr...prompt kerma (1): HEATR/hinit (4)*

---message from hinit---mf6, mt 16 does not give recoil za= 98245  
 one-particle recoil approx. used.

4. Recoil is not given, so one-particle recoil approximation used.  
*heatr...prompt kerma (2): HEATR/hinit (4)*

- message from hinit---mf6, mt 17 does not give recoil za= 98244  
one-particle recoil approx. used.
5. Recoil is not given, so one-particle recoil approximation used.  
*heatr...prompt kerma (3): HEATR/hinit (4)*
- message from hinit---mf6, mt 51 does not give recoil za= 98246  
one-particle recoil approx. used.
6. Recoil is not given, so one-particle recoil approximation used.  
*heatr...prompt kerma (4): HEATR/hinit (4)*
- message from hinit---mf6, mt 52 does not give recoil za= 98246  
one-particle recoil approx. used.
7. Recoil is not given, so one-particle recoil approximation used.  
*heatr...prompt kerma (5): HEATR/hinit (4)*
- message from hinit---mf6, mt 53 does not give recoil za= 98246  
one-particle recoil approx. used.
8. Recoil is not given, so one-particle recoil approximation used.  
*heatr...prompt kerma (6): HEATR/hinit (4)*
- message from hinit---mf6, mt 54 does not give recoil za= 98246  
one-particle recoil approx. used.
9. Recoil is not given, so one-particle recoil approximation used.  
*heatr...prompt kerma (7): HEATR/hinit (4)*
- message from hinit---mf6, mt 91 does not give recoil za= 98246  
one-particle recoil approx. used.
10. Recoil is not given, so one-particle recoil approximation used.  
*heatr...prompt kerma (8): HEATR/hinit (4)*
- message from hinit---mf6, mt102 does not give recoil za= 98247  
photon momentum recoil used.
11. There is a problem with the fission energy release.  
*heatr...prompt kerma (21): HEATR/nheat (3)*
- message from nheat---changed q from 2.190356E+08 to 2.073341E+08  
for mt 18
12. Evaluation has no resonance parameters given  
*purr...probabalistic unresolved calculation (0): No RR*
- message from purr---mat 9843 has no resonance parameters  
copy as is to nout